In the Claims:

Claims 1 – 86 (Canceled).

87. (New) A method of regulating an activity of a SMAD protein in a cell, the method comprising contacting the cell with an agent capable of modulating an expression and/or an activity of TAK1 in the cell, thereby regulating the activity of the SMAD protein in the cell.

88. (New) The method of claim 87, wherein said regulating the activity of the SMAD protein is stimulating or enhancing the activity of the SMAD protein, and whereas said modulating said expression and/or said activity of TAK1 is diminishing or abrogating said expression and/or said activity of TAK1.

89. (New) The method of claim 87, wherein said agent comprises a polypeptide encoded by a nucleic acid having a nucleotide sequence at least 70 % homologous to SEQ ID NO: 1 and/or SEQ ID NO: 2.

90. (New) The method of claim 87, wherein said agent comprises a single-stranded or double-stranded oligonucleotide which is at least 12 nucleotides in length and is specifically hybridizable with SEQ ID NO: 1 and/or 2.

91. (New) The method of claim 87, wherein said agent comprises an oligonucleotide having a nucleic acid sequence at least 70 % homologous to SEQ ID NO: 3 and/or 4.

92. (New) The method of claim 87 wherein said activity of TAK1 is a kinase activity and/or an interaction of TAK1 with an MH2 domain of the SMAD protein.

93. (New) The method of claim 87, wherein said regulating the activity of the SMAD protein is diminishing or abrogating the activity of the SMAD protein, and whereas said modulating said expression and/or said activity of TAK1 is stimulating or enhancing said expression and/or said activity of TAK1.

94. (New) A method of regulating osteogenesis and/or bone repair in a subject in need thereof, the method comprising contacting a cell with osteogenic potential with an agent capable of modulating an expression and/or an activity of TAK1 in the cell, wherein:

(i) said cell is located in the subject; and/or

(ii) said contacting is effected *in-vitro*, thereby generating a treated cell, and the method further comprises the step of administering said treated cell to the subject, thereby regulating osteogenesis in the subject.

95. (New) The method of claim 94, wherein said regulating osteogenesis and/or bone repair is stimulating or enhancing osteogenesis and/or bone repair, and whereas said modulating said expression and/or said activity of TAK1 is diminishing or abrogating said expression and/or said activity of TAK1.

96. (New) The method of claim 94, wherein said agent comprises a polypeptide encoded by a nucleic acid having a nucleotide sequence at least 70 % homologous to SEQ ID NO: 1 and/or 2.

97. (New) The method of claim 94, wherein said agent comprises a single-stranded or double-stranded oligonucleotide which is at least 12 nucleotides in length and is specifically hybridizable with SEQ ID NO: 1 and/or 2.

98. (New) The method of claim 94, wherein said agent comprises an oligonucleotide having a nucleic acid sequence at least 70 % homologous to SEQ ID NO: 3 and/or 4.

99. (New) The method of claim 94, wherein said cell with osteogenic potential is selected from the group consisting of a mesenchymal stem cell, a progenitor cell, an osteoblast and a cell capable of differentiating into an osteoblast.

100. (New) The method of claim 94, wherein said cell with osteogenic potential is located in the subject at a site of inflammation, and/or wherein said administering said cell is effected by administering said cell to the subject at a site of inflammation.

101. (New) The method of claim 94, wherein the subject suffers from a disease selected from the group consisting of inflammation-mediated bone loss, periodontal disease, osteoarthritis, Kohler's bone disease, rheumatoid arthritis and osteoporosis.

102. (New) The method of claim 94, wherein said activity of TAK1 is a kinase activity and/or an interaction of TAK1 with an MH2 domain of a SMAD protein.

103. (New) The method of claim 94, wherein said regulating osteogenesis and/or bone repair is diminishing or abrogating osteogenesis and/or bone repair, and whereas said modulating said expression and/or said activity of TAK1 is stimulating or enhancing said expression and/or said activity of TAK1.

104. (New) The method of claim 94, wherein said cell with osteogenic potential is located at a site of lung injury and/or persistent infection in the subject.

105. (New) A composition comprising an isolated nucleic acid having a nucleic acid sequence at least 70 % homologous to a nucleic acid sequence of a nucleic acid selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, an antisense strand of SEQ ID NO: 1, and an antisense strand of SEQ ID NO: 2.

106. (New) A vector comprising the nucleic acid sequence of claim 105.

107. (New) The vector of claim 20, further comprising a promoter for regulating transcription of the nucleic acid in sense or antisense orientation, and/or further comprising positive and/or negative selection markers for selecting for homologous recombination events.

108. (New) A host cell or an animal comprising the vector of claim 106.

109. (New) The host cell of claim 108, wherein the host cell is selected from the group consisting of a mesenchymal stem cell, a progenitor cell, an osteoblast and a cell capable of differentiating into an osteoblast.

110. (New) A single-stranded or double-stranded oligonucleotide at least 12 bases in length specifically hybridizable with a nucleic acid selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, an antisense strand of SEQ ID NO: 1 and an antisense strand of SEQ ID NO: 2.

111. (New) The oligonucleotide of claim 110, wherein said oligonucleotide comprises a nucleic acid having a sequence at least 70 % homologous to SEQ ID NO: 3 and/or 4.